



## **USTAR Hire Improves Bomb-Detecting Device**

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The military sends soldiers into war zones with guns, armored vehicles and other protections, but soldiers still die when bombs are triggered, destroying anything nearby.

University of Utah researchers are collaborating to develop an improved device to detect explosives at least 50 meters away.

Ling Zang has only been a professor at the U of U for three months, but he is already working with College of Engineering Dean Richard Brown to improve a device he patented last year that detects chemicals from explosives in the air.

Zang, a material science and engineering professor, was recruited from the University of Illinois as part of the Utah Science Technology and Research Initiative (USTAR) to bring world-renowned researchers to the U of U.

The Utah State Legislature opened the program in 2006 with hopes of stimulating the economy through newly developed businesses derived from research at the U of U and Utah State University.

Zang worked with other researchers at the University of Illinois to develop and patent the original device, which recognizes leaking chemicals from bombs based on an optical sensing mode. The device contains sensing materials that emit a blue light. If the blue light ceases, it indicates the presence of leaking explosives in the air.



The U.S. Department of Homeland Security requires that detection devices recognize explosives at a minimum of 50 meters in distance. Zang said the device will go through the department's approval process in early 2009, but in the meantime, he wants to improve it.

Instead of just detecting explosives through light emission, Zang said the device will recognize even smaller amounts of explosives and be more accurate if they combine it with a system that relies on electrical sensing, i.e., detecting chemicals based on modulation of electrical current running through the sensory materials.

“We can tell how many molecules stay on a nanofiber of the device,” Zang said. “Even a small change in the signal could mean a bomb in a distant location.”

The dual-reading device could also recognize a bomb or other explosive from farther distances, limiting the risk to soldiers or members of a bomb squad.

Brown said students in the College of Engineering are developing a process to manufacture the device with molecules placed closer together, which will make the device more sensitive to changes in the air.

“We’re in a very early stage of collaboration but are really excited to work with (Zang),” Brown said. “This device he’s developed has a huge potential to make life safer for Americans.”

Brown said credit for the dual-mode device belongs entirely to Zang. He said the U of U is mostly contributing through engineering work and giving him access to a nanofabrication facility that can manufacture small parts for the device.

Zang said he was excited to move to the U of U because he can work with leading researchers in his field and collaborate on different projects across the U.

“I see a very good community for myself to expand my research,” Zang said.

He is also working on detecting mercury levels in Utah and the efficiency of organic materials.

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*USTAR note – Ling Zang is part of the USTAR Nanotechnology Biosensors team. His research covers a broad range in nanomaterials, nanoscale and molecular imaging and probing, optoelectronic sensors and nanodevices, aiming at long-term real applications in the fields relevant to security, energy, and environment. Implementation of the research represents a synergism between 'making', 'measuring' and 'manipulating', where the conventional barriers between chemistry, physics and engineering will be broken down.*

#### About USTAR

The Utah Science Technology and Research initiative (USTAR) is a long-term, state-funded investment to strengthen Utah's "knowledge economy" and generate high-paying jobs. Funded in March 2006 by the State Legislature, USTAR is based on three program areas. The first area involves funding for strategic investments at the University of Utah and Utah State University to recruit world-class researchers. The second area is to build state-of-the-art interdisciplinary facilities at these institutions for the innovation teams. The third program area involves teams that work with companies and entrepreneurs across the State to promote science, innovation, and commercialization activities. For more information, go to [www.innovationutah.com](http://www.innovationutah.com).

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